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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,000	04/26/2001	Toru Otsubo	503.39737X00	7052

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EXAMINER	
CROWELL, ANNA M	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/842,000	OTSUBO, TORU	
	Examiner	Art Unit	
	Michelle Crowell	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 7, and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 9, 2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsubo et al. (Japanese Patent Publication 11-260596) in view of Gesche et al. (U.S. 5,140,223) and Tobe et al. (U.S. 5,891,349).

Referring to Drawing 1 and 16, and paragraphs [0113]-[0130], Otsubo et al. discloses a plasma processing apparatus comprising a plasma processing gas supply means, an exhaust air means [0114], plasma generating means and capacitively coupled discharge means consisting of mutually isolated conductors (counterelectrodes 71a 71b 71c) [0115], a magnetic field forming means (a coil 58) [0131], and electromagnetic wave radiating means (counterelectrodes with RF

generators 81 and 82), a capacitor 83, and a stage electrode 52. Insulating materials 80a 80b 80c mutually insulates each of the counterelectrodes 71a 71b 71c, thereby creating mutually isolated multiple conductors [0115].

Additionally, a high-frequency voltage 81 and 82, whose phase can be shifted by a capacitor 83, is supplied to the counterelectrodes 71, thereby generating electromagnetic waves. The power of electromagnetic waves radiates through the insulators and counterelectrodes. A resonant circuit is formed via the insulators 80 and the capacitor 83. The signal generator 97 controls the phase of the high-frequency signal [0130]. Alternately, the electromagnetic waves can be generated by antenna 11 [0041].

Specifically, the distribution of the plasma density can be controlled by controlling the radiated electromagnetic waves based on the adjustment of the phase of the high-frequency voltage supplied to the counterelectrodes 71. Moreover, the distribution of the plasma density due to capacitive coupled plasma can be controlled by controlling the outputs of the high frequency power supplies 81 and 82 [0131].

Regarding claims 7 and 8, a means to send RF current (bias power supply 56) to a substrate 55 [0122].

Regarding claim 8, multiple RF current conducting means (counterelectrodes 71a 71b 71c) are installed at a position opposite to a position where the substrate 55 to be processed is mounted. The multiple RF current conducting means are provided with a means (filters) to control a ratio of RF current flowing from the substrate to be processed to each of the RF current conducting means. Moreover, each counterelectrodes 71a 71b 71c is grounded through low pass filters (not shown), and a high-frequency current from a bias power supply 56 is allowed to flow

through each of the counterelectrodes 71a 71b 71c [0116]. Thus, the filter controls the ratio of RF current flowing from the substrate to each of the counterelectrodes 71a 71b 71c.

Otsubo et al. fails to teach a radio frequency displacement control means forming a LC circuit.

Referring to Drawings 1 and 2, Gesche et al. teaches a plasma processing apparatus wherein an electromagnetic wave radiating means 1 (high frequency power supply) includes a radio frequency displacement control means forming a LC circuit 9, 10 which is connected to a matching box 2 in order to satisfy adjustment conditions necessary with high frequency power. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Otsubo et al. with the radio frequency displacement control means forming a LC circuit as taught by Gesche et al. since adjustment conditions necessary with high frequency power are satisfied.

Otsubo et al. fails to specifically teach an electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply.

Referring to Figures 1 and 8, column 10, lines 6-57, and column 14, lines 17-30, Tobe et al. teaches a plasma processing apparatus comprising an electromagnetic wave radiating means (electrode 61) which includes a radiated electromagnetic wave power control means including a distribution controller 105 (variable capacitor controller) to control the radiated electromagnetic waver power through the variable capacitor 81a. Variable capacitors are used to control the

electrode's potential. The controller is used to more precisely control the inputs/outputs of the variable capacitors. Thus, it would have been obvious to one of ordinary skill in the art to control variable capacitor of the radio frequency displacement control means of Otsubo et al. in view of Gesche et al. with the electromagnetic wave power control means as taught by Tobe et al. This would precisely control the potential of the electromagnetic wave radiating means, and thus control the plasma distribution. With regards to the distribution controller being connected to a matching box and a high frequency power supply. As seen by Otsubo et al. in view of Gesche et al., the variable capacitor 9 is connected to matching circuit 2 and a high frequency power supply 1. Tobe et al. teaches a distribution controller 105 connected to a variable capacitor. Thus, the combination of Otsubo et al in view of Gesche et al. and Tobe et al. shows connecting the distribution controller to a matching box and a high frequency power supply via the variable capacitor.

Otsubo et al. fails to teach a means to store and a means to control plasma distribution.

Regarding claim 3, column 10, lines 45-57, Tobe et al. discloses a plasma processing apparatus having a distribution controller 105 (variable capacitor controller) which includes a CPU. The CPU is capable of storing a processing procedure to control distribution during plasma processing, and thus control plasma distribution according to the processing procedure stored. Therefore, it would have been obvious to one of ordinary skill in the art to provide electromagnetic wave radiating means of Otsubo et al. with the means to store and means to control plasma distribution as taught by Tobe et al. This would precisely control the potential of the electromagnetic wave radiating means, and thus control the plasma distribution.

Response to Arguments

4. Applicant's arguments filed April 9, 2004 have been fully considered but they are not persuasive.

Applicant has argued that Otsubo et al. fails to disclose an electromagnetic wave radiating means comprising a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, and the radiated electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant circuit. The Examiner agrees that Otsubo et al. fails to disclose the above limitation; however, the above limitation was rejected over a combination of references. The combination of Otsubo et al in view of Gesche et al. and Tobe et al. teaches an electromagnetic wave radiating means comprising a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, and the radiated electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant circuit (discussed in 103 rejection). Furthermore, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant agrees that Gesche et al. discloses a matching box 2 connected to a high frequency power supply 1 for providing radio frequency displacement current to the LC resonant circuit; however, Gesche et al. fails to teach a distribution controller connected to the matching circuit and high frequency power supply and the formation of an additional LC resonant circuit with the control in the manner defined. As stated above, the claimed limitation was rejected over a combination of references. The combination of Otsubo et al in view of Gesche et al. and Tobe et al. teaches an electromagnetic wave radiating means comprising a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, and the radiated electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant circuit (discussed in 103 rejection). In Otsubo et al. in view of Gesche et al., the variable capacitor 9 is connected to a matching circuit 2 and a high frequency power supply 1 and it shows a LC resonant circuit. Tobe et al. teaches a distribution controller 105 connected to a variable capacitor for controlling the variable capacitor. Thus, the combination of Otsubo et al in view of Gesche et al. and Tobe et al. shows connecting the distribution controller to a matching box and a high frequency power supply via the variable capacitor. Additionally, Tobe et al. was applied to simply demonstrate that it is well known in the art to control a variable capacitor using a controller(distribution controller). Therefore, the apparatus including a LC resonant circuit, a matching box , and a high frequency power supply of Otsubo et al. in view of Gesche et al. can be modified to include a distribution controller as taught by Tobe et al. in order to control the potential of the electromagnetic wave radiating

means and hence the plasma distribution. Once again, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant has argued that Tobe et al. fails to disclose an electromagnetic wave radiating means comprising a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, and the radiated electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant circuit. The Examiner agrees that Tobe et al. alone fails to disclose the above limitation; however, the above limitation was rejected over a combination of references. As stated above, the combination of Otsubo et al in view of Gesche et al. and Tobe et al. satisfies the claimed requirement. As stated before, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants have argued that Tobe et al. fails to store a processing procedure and a means to control plasma distribution. However, Tobe et al. teaches a CPU which is capable of storing a processing procedure to control distribution during plasma processing. Additionally, since the variable capacitor controller of Tobe et al. controls the variable capacitor, varying the capacity of the variable capacitor controls the plasma distribution. A specific processing procedure has not

been claimed, thus Otsubo et al. in view of Gesche et al and Tobe et al. satisfy the claimed requirement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:00 - 5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC
May 24, 2004

GREGORY MILLS
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